

# Memorandum

To: MR. KEVIN ROSS  
Structures Design  
Office of Bridge Design – South  
Bridge Design Branch 12

Date: January 14, 2002

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Attention: Daniel Texler



Vehicular UC  
Bridge No. 57-1081 R/L

From: DEPARTMENT OF TRANSPORTATION  
DIVISION OF ENGINEERING SERVICES  
Geotechnical Services  
Office of Geotechnical Design South - MS 5

Subject: Amended Foundation Recommendations

The purpose of the "amended" Foundation Recommendations is address design changes made to the proposed Vehicular Undercrossings (Bridge No. 57-1081 R/L). The design changes incorporate lowered bottom of footing elevations at all support locations for the proposed bridge. The "amended" Foundation Recommendations changes were requested from the Office of Bridge Design - South (OBDS) in a letter dated November 7, 2001.

## Foundation Recommendations

The following Foundation Recommendations are for all support locations of the proposed Vehicular Undercrossings (Br. No. 57-1081 R/L) as shown on the Foundation Plan and the General Plan (dated 10-29-01).

Based upon the Foundation Plan (dated 10-29-01), the Abutment 1 of the Right Bridge (Br. No. 57-1081R) and Abutment 2 of the Left Bridge (Br. No. 57-1081L) are partially situated on the top of the formational earth materials (La Jolla Group) described in the "original" Foundation Recommendations. To eliminate the potential for differential settlement to occur across the Vehicular Undercrossing, Abutment 1 (Right Bridge) and Abutment 2 (Left Bridge) support locations, sub-excavation of formational earth materials and replacement with engineered fill compacted to 95% relative compaction is recommended.

The Abutment 1 (Left Bridge) support location (Br. No. 57-1081L) will be entirely situated in a cut of formational earth materials (La Jolla Group) described in the "original" Foundation Recommendations. The Abutment 2 (Right Bridge) support location (Br. No. 57-1081R) will be located on engineered fill constructed for the roadway approach to the bridge structures. The recommended Gross Allowable and Ultimate Soil Bearing Pressures to be used for design are listed below in Table 1.

**Table 1: Spread Footing Data**  
**Vehicular Undercrossings (Br. No. 57-1081 R/L)**

Support Location	Minimum Footing Width (m)	Bottom of Footing Elevation (m)	Recommended Soil Bearing Pressures	
			ASD (1)	LFD(2)
			Gross Allowable Soil Bearing Pressure ( $q_{all}$ )	Ultimate Soil Bearing Pressure ( $q_{ult}^*$ )
Abutment 1 (Left Bridge)	3.6	82.68	192 kPa (4.0 ksf)	N/A
Abutment 2 (Left Bridge)	3.6	82.42	192 kPa (4.0 ksf)	N/A
Abutment 1 (Right Bridge)	3.6	81.11	192 kPa (4.0 ksf)	N/A
Abutment 2 (Right Bridge)	3.6	80.85	192 kPa (4.0 ksf)	N/A

Notes: 1) Allowable Stress Design, (ASD). The Maximum Contact Pressure, ( $q_{max}$ ), is not to exceed the recommended Gross Allowable Soil Bearing Pressure, ( $q_{all}$ ). The Ultimate Soil Bearing Capacity, ( $q_{ult}$ ), will equal or exceed 3 times the recommended Gross Allowable Soil Bearing Pressure, ( $q_{all}$ ).  
2) Load Factor Design, (LFD). The Maximum Contact Pressure, ( $q_{max}$ ), divided by the Strength Reduction Factor, ( $\phi$ ), is not to exceed the recommended Ultimate Soil Bearing Pressure, ( $q_{ult}^*$ ). The Ultimate Soil Bearing Capacity, ( $q_{ult}$ ), will equal or exceed the recommended Ultimate Soil Bearing Pressure, ( $q_{ult}^*$ ).

The recommended gross allowable soil bearing pressures to be used for design, listed in Table 1, are based upon the following design criteria:

- (1) All abutment footings have a minimum footing width of 3.6 meters for the abutments.
- (2) All abutment footings are positioned such that there will be a minimum horizontal distance of 1.22 meters from the near face/top of the footing to the face of the finished slope (Bridge Design Specifications 4.4.2.1).
- (3) Concrete at all support locations, with respect to the bottom of the footing excavation, shall be placed neat against the undisturbed engineered fill material at all support locations except for Abutment 1 (Left Bridge). At the Abutment 1 (Left Bridge) support location, the bottom of the footing excavation, shall be placed neat against the undisturbed formational earth materials.
- (4) At Vehicular Undercrossing, the Abutment No. 1, (Right Bridge) and Abutment No. 2, (Left Bridge) footings shall be supported on 1.0 meter of engineered fill compacted to 95% relative compaction. The limits of sub-excavation and replacement with structure back fill shall extend down to elevation 80.11 meters at Abutment No.1, Right Bridge, and to elevation 81.11 at Abutment No. 2, Left Bridge. The limits of sub-excavation and replacement with structure backfill shall conform to the limits required for relative compaction under retaining wall footings without piles as defined in section 19-5.03 of the Standard Specifications.
- (5) All footings are to be constructed at or below the bottom of footing elevations listed above in Table 1 above.

If any of the above minimum footing widths, horizontal embedment depth or sub-excavation limits are reduced, the SFS is to be contacted for reevaluation.

The recommendations contained in this report are based on specific project information regarding design loads and structure location that has been provided by OBDS. The Foundation Recommendations, "General Notes" and "Construction Considerations" detailed in the "original" Foundation Recommendations for the proposed Vehicular Undercrossings (Bridge No. 57-1081 R/L) dated January 31, 2001 are still applicable with the addition of the above mentioned foundation recommendations. If any conceptual changes are made during final project design, the Office of Geotechnical Design - South, Structure Foundations Branch - South should review those changes to determine if these foundation recommendations are still applicable. Any questions regarding the above recommendations should be directed to the attention of Hector Valencia (916) 227-7081 (CALNET 498-7081) or Mark DeSalvatore (916) 227-7056 (CALNET 498-7056), Office of Geotechnical Design - South, Structure Foundations Branch - South.

Memorandum by:



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Supervised by:



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Date: 1/17/02



c: R.E. Pend. File - Struc Const  
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